
Workshop A

Roles of Academia, Industry and Government

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The expansion of agriculture into health, energy, chemicals and materials will require new skills and staffing, and additional investments in research, development and commercialization, along with specialized facilities. Participants in this workshop were asked to consider what role academia, industry and government should play in the development of a biobased economy. Three broad issue-areas were identified as important considerations in this development: partnerships, communication, and maintenance of research credibility/objectivity.

PARTNERSHIPS

Well-organized partnering between academia, industry, and government, as well as between and among various disciplines within academia will be critical to the success of a biobased economy. Academia should promote (and not hinder, as has sometimes been the case) multi-disciplinary team approaches to research. These teams should engage not only biological and agricultural scientists, but physicists, chemists, and social scientists. Industry should form alliances to fund basic research and become affiliated more closely with academia in terms of articulating research needs, or in jointly conducting research with academic scientists. Government should be involved at all levels (federal, state, local) to facilitate linkages, to aid in planning, prioritizing and conducting biobased research with academia and industry, and in providing funding opportunities as well as other incentives that would foster the development of partnerships.

RECOMMENDATIONS

Assembly of multi-disciplinary teams within academia

- When research administrators are hired, it should be made clear that one of their responsibilities is to enable multi-disciplinary research. Also, their performance as productive administrators would be evaluated accordingly.
- An academic institution must value accomplishments made by multi-disciplinary teams by recognizing team members with full rewards and credits for their achievements.
- Academia should look to hire faculty who have an interest in collaborative research and who will make such connections a high priority in their programs.
- Seed monies are needed from all sectors (public, private and government) to establish multi-disciplinary teams.
- Stakeholders outside of academia should be active participants in the research when appropriate.

Development of funding consortia

- Funding consortia would consist of all three segments: academia, industry (including non-agricultural companies), and government (all levels, and possibly the largest contributor).
- One main objective of any funding consortium would be to create “Biobased Centers.” These may be real or virtual laboratories for core, basic, long-term biobased research; they may also support more applied, short-term research. Scientists from academia, industry and government would be active researchers at these centers.

COMMUNICATION

All sectors involved in funding, conducting and commercializing biobased research must increase their efforts to communicate not only the benefits but also the potential risks of biotechnology-based products and processes. Particular attention should be paid to communicating sound, science-based information to the general public, to particular clientele groups (farmers, processors, direct consumers), to the news media, and to members within their own businesses or institutions. To this end, scientists and administrators in academia, industry and government all need to be involved in developing communication strategies that promote scientific literacy — especially literacy about biotechnology — on local, national and global scales. Further funding for communications research in this area will be necessary, since many strategies for communicating science and technology in the past have not been successful. For the biobased economy to become a reality, people who are well versed in the pertinent issues must make informed decisions. This should result in responsible uses of biotechnology, and perhaps even eliminate the need for

strong government scrutiny and regulations. Science can and should serve the public good, and effective communication of this fact is a key.

RECOMMENDATIONS

Communication workshops

- Workshops focusing on effectively communicating science and biotechnology issues should be developed in order to determine what techniques and methods of communicating science work best.
- Workshops designed to highlight and educate participants in risk communication (or risk/benefit communication) would be valuable to all sectors.
- Listening sessions should be conducted involving stakeholders, so that their ideas and concerns are heard and discussed. The outcomes of these sessions would serve as the basis for future development of appropriate messages to effectively reach specific target audiences.

Improvement in scientific literacy

- Development of science outreach programs for K–12, and science workshops for K–12 teachers to educate them about biotechnology and a biobased economy.
- Design and implement biotechnology curricula at all educational levels.
- Conduct extension activities to communicate with particular target audiences through printed media, web-based media, and workshops.

Facilitation of information transfer between scientists and the news media

- Train scientists in how to effectively communicate with non-scientists on science-related issues.
- All sectors should make “expert” spokespersons available to the media.
- Media should be invited to campuses, research centers, etc. for demonstrations, tours and seminars.

MAINTENANCE OF RESEARCH CREDIBILITY/OBJECTIVITY

Although increased partnering between academia and industry would generally be desirable in furthering a biobased economy, it does carry some risks. In particular, questions may be raised about the credibility and objectivity of academic research since funding would be provided by industry directly to academia. Any public perception that academic scientists lack credibility would seriously hamper efforts to increase the public's scientific literacy through effective science communication. Indeed, no one will believe the message if the messenger is not trustworthy. Therefore, it is imperative that research objectivity be preserved in order for credibility to be maintained. Without this credibility/objectivity, a biobased economy may never reach its potential.

RECOMMENDATIONS

Maintenance and improvement of funding structure

- Ensure that there is core funding (public universities, public centers) for operating costs and to conduct essential research according to agendas set by scientists and administrators within academic institutions.
- Some industry funds should be placed in a general or iescrowî account to finance research by academia into safety or efficacy of industry products. Decisions regarding the distribution of these funds to specific individuals/projects should not be determined by the industry, but again, by those in the academic institution.
- Academic freedom and independent peer-review of research results never should be compromised by the funding source.

Create a “disconnect” between industry and Extension.

- Those, whose positions include communicating about biotechnology and the biobased economy, such as Extension faculty, should be independent of particular industry support and should not be in any position to benefit from research results.
- A complete discussion encompassing all sides of a biotechnology issue, including ethical, environmental, social, and legal aspects, should be brought out by those communicating the impact of this research.

There is little doubt that we are moving toward a biobased economy. However, in order for this transition to be efficient, sustainable, and, ultimately, in the service of the greater public good, new and creative ways will be needed, in which public institutions and private enterprises can structure, fund, and monitor research and development of biobased processes and products. Moreover, there must be a spirit of openness on the part of individuals and institutions involved in the move to a biobased economy, in order to ensure public trust in science, and ultimately to guarantee, as far as possible, that real benefits associated with biobased processes and products are obtained. Participants in this workshop area articulated the need to move forward toward the biobased economy, though with a constant eye on potential risks as well as benefits.

APPENDIX

Contributions from workshop participants that may not be directly covered in the three areas described above, were as follows:

- Congress should pass legislation to support industrial biobased research centers at the university level.
- The federal government needs to aid in the development of markets for biobased products by providing the necessary incentives and minimizing investment barriers.

- USDA must be more aggressive/successful in obtaining funds for competitive grant programs; NIH, for example, does a much better job.
- The federal government needs to articulate the need for biobased research and fund it as it has done for NASA.
- Peer-review for safety and efficacy testing should be demanded of the industry and the findings should be in the public record.
- Industry should provide graduate-level internships.
- Intellectual property guidelines need to be in place to promote commercialization while protecting society.
- Patents and intellectual property issues are having a paralyzing effect on developing commercial products from academia.
- Ways must be found to redirect faculty to conduct research on biobased product development.
- Universities need to provide a better context for entrepreneurship.
- Biobased research at universities often does not support the needs of the industry because there is no dialogue between the two when fundamental decisions about research first take place. This situation needs to be changed so that initial decisions are made together.
- A small group of leaders is needed from all sectors to champion the biobased vision.